

NOTES ON THE GENUS *LIBERA*.

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THE genus *Libera* was defined by Garrett in Journ. Acad. Nat. Sci. Phil., 1881, ser. II, vol. viii, p. 390, no mention being made of any type, though it may be, perhaps, inferred from a remark on p. 389 that he considered *Helix bursatella*, Gld., 1846, to be the type. It was not till 1894 that Pilsbry, in the Man. Conch., vol. ix, p. 23, selected *subcavernula*, Tryon, to represent the genus. It is, perhaps, a pity that he did not choose the older species, *bursatella*, which is in every way typical, besides being distinctly in literature the ancestor of the group. Gould evidently considered, as shown by his description and figures, that he was dealing with one very variable form, but several species were subsequently carved out of it. This led to much confusion, for, as Garrett rather quaintly observes, "Dr. Pfeiffer appears to have been somewhat bewildered in his treatment of the various species described by Gould, Reeve, Hombron and Jacquinot, and himself." In 1849 Pfeiffer described *Jacquinoti* and *coarctata*, species which he then proceeded to mix up in the most unaccountable and perplexing way with others described by Hombron & Jacquinot. Garrett subsequently described several species, and his excellent papers are full of information about the shells and their inhabitants, and their curious habit of "ovopositing into their cavernous umbilicus" (see also Cooke in Cambridge Nat. Hist., vol. iii, Mollusca, pp. 128, 327, 441). The group, comprising ten species, seems to be confined to the Society and Cook Islands, though *fratercula* has been quoted from Gambier Island and Paumotu, and the Marquesas have been given as the habitat of *Jacquinoti*, which, however, Garrett is "inclined to believe" inhabits the Austral Islands.

Mention must here be made of *Helix oceanica*, Le Guill., a species included by some writers in this genus. Described in 1842 (Rev. Zool., p. 140), it has never been figured. Pfeiffer copied the description in Mon. Hel., vol. i, p. 120, but adds nothing in the subsequent volumes. Gould, in the "Otia", quotes it as synonym of the all-embracing *H. bursatella* (in which case Le Guillou's name would have priority!) from a specimen in the Jardin des Plantes. Pease quotes it in P.Z.S., 1871, remarking that no mention is made of any peristomatal lamellæ. In Pætel it appears as a *Goniodiscus*. Fischer and others make it a *Patula*, and so on. Through the kindness of Dr. L. Germain the writer was able to inspect a specimen so named in the Paris Museum; it proved to be *Jacquinoti*, Pfr. Mons. Dautzenberg obligingly submitted a specimen from the collection of Mons. Crosse; it turned out to be *bursatella*, Gld. As the description is meagre, as there is no figure, and as there is apparently no authentic specimen, it is suggested that *Helix oceanica*, Le Guill., may safely be relegated to the limbo of 'species incognitæ'.

It may be of some interest to remark that on reference to the *Voyage au Pole Sud*, the authorship of which is ascribed to Hombron and Jacquinot, it will be seen that the descriptions of the shells were written, not by those gentlemen, but, as appears on the first page, by "L. Rousseau, Aide Naturaliste au Muséum d'histoire naturelle". In the 'introduction', signed by the above-named Rousseau, he states that "as Messrs. Hombron & Jacquinot have had most of the shells figured and determined, it only remained for me to describe them". This he proceeds to do, attributing the authorship to Hombron and Jacquinot. It is left to those who are skilled in bibliography to determine who, under the circumstances, should be considered to be the authors.

The species may be arranged as follows:—

1. *subcaavernula*, Tryon (*caavernula*, Garr., non H. & J.).
2. *fratercula*, Pse. (*sculptilis*, Pse., non Bland).
3. *Jacquinoti*, Pfr. (*bursatella*, Gld., part.; *caavernula*, H. & J., non Garr.).
4. *bursatella*, Gld.
5. *tumuloides*, Garr.
6. *retunsa*, Pse.
7. *streptaxon*, Rve. (*bursatella*, Gld., part.; *turricula*, H. & J., non Lowe; *coarctata*, Pfr., non Desh.).
8. *gregaria*, Garr.
9. *recedens*, Garr.
10. *Heynemanni*, Pfr. (*bursatella*, Gld., part. (Garrett); ? *excavata*, H. & J., non Bean).

1. LIBERA SUBCAVERNULA, Tryon.

1872. Garrett, Amer. Journ. Conch., vol. vii, p. 226, pl. xix, fig. 16 (*caavernula*, Garr., non H. & J., 1854).
1874. Cat. Mus. Godeff., v, p. 94 (*Patula*).
1876. Pfr., Mon. Hel., vol. vii, p. 538 (quotes Amer. Journ., vol. vii, p. 229 *vice* 226).
1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 220 (*Patula*).
1881. Clessin, Nomenclator, p. 96.
1881. Garrett, Journ. Acad. Nat. Sci. Phil., p. 392.
1887. Tryon, Manual, vol. iii, p. 70 (*subcaavernula*, Tryon), pl. xiii, figs. 67-9.
1889. Pætel, Cat., p. 91.
1894. Pilsbry, Manual, vol. ix, p. 24 (*subcaavernula*, Tryon): selected as type of genus, p. 23, pl. v, figs. 45-7.
- Hab.*—"Peculiar to Rarotonga" (Garrett).

2. LIBERA FRATERCULA, Pease.

1864. Pse., P.Z.S., p. 669, *sculptilis*, Pse. (non Bland, 1858).
1867. Pse., Amer. Journ. Conch., vol. iii, p. 104 (*fratercula*, Pse.).
1868. Pfr., Mon. Hel., vol. v, p. 217 (*sculptilis*).
1871. Pse., P.Z.S., pp. 452, 475 (*Pityis fratercula*), Rarotonga.
1872. Garrett, Amer. Journ. Conch., vol. vii, p. 226.
1874. Cat. Mus. Godeff., p. 94 (*Patula sculptilis*).

1876. Pfr., Mon. Hel., vol. vii, p. 253.
 1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 221 (*Patula fratercula*, Gambier), Cook Island (p. 222).
 1881. Clessin, Nomencl., p. 95, *End. fratercula*, Pse. (*sculptilis*, Pse.).
 1881. Fischer, Manuel, p. 255 (*Patula*).
 1881. Garrett, Journ. Acad. Nat. Sci. Phil., p. 392 (*Libera*).
 1887. Tryon, Manual, vol. iii, p. 70, pl. xiii, figs. 64-6.
 1889. Pætel, Cat., and var. *sculptilis*, p. 85.
 1894. Pilsbry, Manual, vol. ix, p. 24, *sculptilis*; altered p. 339 to *fratercula*, pl. v, fig. 48, *fratercula* (young), p. 23 (in explan. of plates, p. 347, as *subcavernula*).

Hab.—Mangier Island (? Mangaia Island, Garr.), Harvey Island (Pse.), Paumotus, Gambier Island (Fischer), Gambier and Cook Islands (Kobelt).

3. *LIBERA JACQUINOTI*, Pfr.

1849. Pfr., Zeits. für Malak., p. 73 = *bursatella*, Gld., var. β .
 1849. Pfr., P.Z.S., p. 128.
 1852. Reeve, Conch. Icon., vol. vii, fig. 631 (*ex Mus. Cum.*).
 1853. Conch. Cab., p. 296, pl. cxxv, figs. 26-8 (*bursatella*, Gld., β ; *excavata*, H. & J.).
 1853. Pfr., Mon. Hel., vol. iii, p. 143 (syn. *excavata*, H. & J.; *bursatella*, Gld., β ; Homb. & Jacq., Voyage au Pole Sud, p. 21 (*cavernula*, H. & J.), figs. 3-6).
 1857. Pfr., Malak. Blätt., p. 33 (*bursatella*, Gld., var., figs. 52*d*, *f*; *cavernula*, Jacq.).
 1858. H. & A. Adams, Genera, vol. ii, p. 113 (*Pitys Jacquinoti*).
 1859. Pfr., Mon. Hel., vol. iv, p. 154 (? *cavernula*, H. & J.).
 1860. Albers, Heliceen, p. 90 (*Endodonta Jacquinoti*).
 1868. Pfr., Mon. Hel., vol. v, p. 220 (? *cavernula*, Jacq.).
 1871. Pse., P.Z.S., pp. 452, 475 (= *cavernula*, H. & J.).
 1872. Garrett, Amer. Journ. Conch., vol. vii, p. 226.
 1876. Pfr., Mon. Hel., vol. vii, p. 255 (syn. *excavata*, H. & J., p. 568 = *cavernula*, Jacq. *ex Pease*).
 1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 220 (*Patula Jacquinoti*, Pfr.).
 1881. Fischer, Manuel, p. 255 (*Patula Jacquinoti*).
 1881. Clessin, Nomencl., p. 96 (syn. *excavata*, H. & J.).
 1884. Garrett, Journ. Acad. Nat. Sci. Phil., ser. II, vol. ix, p. 34.
 1887. Tryon, Manual, vol. iii, p. 71, syn. *excavata* and ?*bursatella*, var., pl. xiii, figs. 75-7 (copies of H. & J., fig. of *excavata*).
 1889. Pætel, Cat., p. 86 (syn. *cavernula*, H. & J., p. 83).
 1894. Pilsbry, Manual, vol. ix, p. 24 (with syn. *excavata*, H. & J.).

Hab.—Tahiti and Marquesas (? Austral Islands, Garrett).

I have tried unsuccessfully to borrow Pfeiffer's type-specimen, said to be in the Museum at Stettin. The figure in Conch. Cab. is not satisfactory, nor indeed is Reeve's.

4. *LIBERA BURSATELLA*, Gld.

1846. Proc. Bost. Soc. Nat. Hist., vol. ii, p. 175.
 1847. Pfr., Mon. Hel., vol. i, p. 185, cum varr. *a* and β .

1849. Pfr., Zeitsch. für Malak., p. 72.
 1850. Albers, Heliceen, p. 89 (*Endodonta*).
 1851-6. Woodward, Manual, p. 424, "Tahiti at 2-5000 alt." (*Helix*).
 1852. Gould, Expedition Shells, p. 51.
 1852. Reeve, Conch. Icon., vol. vii, fig. 635 (*Helix*).
 1852-3. Pfr., Conch. Cab., p. 296 (syn. *turricula*, H. & J.), pl. exxv, figs. 23-5.
 1853. Pfr., Mon. Hel., vol. iii, p. 142 (syn. *turricula*, H. & J.).
 1856. Gould, Expedition Shells, pl. iv, figs. 52, 52a-2m (52b *ex err.* numbered 54b).
 1857. Pfr., Malak. Blätt., p. 33 (?=*excavata*, Jacq.).
 1858. H. & A. Adams, Genera, vol. ii, p. 113 (*Pityis*).
 1859. Pfr., Mon. Hel., vol. iv, p. 154 (syn. *excavata*, Jacq.).
 1860. Albers, Heliceen, p. 90 (*Endodonta*).
 1862. Gould, Otia, p. 22, p. 243 (*Pityis*), with synonymy, = *coarctata*, Pfr., 1849, + *turricula*, H. & J. (a distorted var.), + *excavata*, H. & J. (immature), and *streptaxon*, Rve., 1852, = *cavernula*, Jacq., = *oceanica*, Le Guill., "in Jardin des Plantes"!
 1868. Pfr., Mon. Hel., vol. v, p. 219 (syn. *excavata*, H. & J.).
 1869. Frauenfeld, Verh. Zool.-bot. Ges., Wien (*Pityis*), p. 873.
 1870. Semper, Reisen Arch. Philipp., Theil ii, Band iii, p. 135, pl. xvi, fig. 18 (genitalia).
 1871. Pse., P.Z.S., pp. 452, 475 (synonymy).
 1872. Garrett, Amer. Journ. Conch., vol. vii, p. 226.
 1875. Binney, Proc. Acad. Nat. Sci. Phil., p. 248, pl. xxi, fig. 6 (dentition).
 1876. Pfr., Mon. Hel., vol. vii, pp. 255, 567 (syn. *excavata*, H. & J., "teste Pease").
 1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 220 (*Patula*).
 1881. Clessin, Nomencl., p. 96 (*Endodonta*).
 1881. Fischer, Manual, p. 255 (*Patula*).
 1881. Garrett, Journ. Acad. Nat. Sci. Phil., ser. II, vol. viii, p. 390 (*Libera*).
 1884. Id., op. cit., vol. ix, p. 33.
 1887. Tryon, Manual, vol. iii, p. 71 (not *turricula*, H. & J.), pl. xiii, fig. 86.
 1889. Pætel, Cat., p. 82 (*Endodonta*), p. 112 (syn. *Jacquinoti*).
 1894. Pilsbry, Manual, vol. ix, pp. 23, 24.

Hab.—Tahiti and Eimeo.

5. LIBERA TUMULOIDES, Garrett.

1872. Garrett, Amer. Journ. Conch., vol. vii, p. 225, pl. xix, fig. 15.
 1874. Cat. Mus. Godeff., vol. v, p. 94.
 1875. Binney, Proc. Acad. Nat. Sci. Phil., p. 248, pl. xxi, fig. 6 (dentition).
 1876. Pfr., Mon. Hel., vol. vii, p. 567.
 1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 222.
 1881. Fischer, Manuel, p. 255 (*Patula*), Cook and Harvey Islands.
 1881. Clessin, Nomencl., p. 96.
 1881. Garrett, Journ. Acad. Nat. Sci. Phil., ser. II, vol. viii, p. 393.

1887. Tryon, Manual, vol. iii, p. 70, pl. xiii, figs. 70-1.
 1889. Pætel, Cat., p. 91 (*Pityls*).
 1894. Pilsbry, Manual, vol. ix, pp. 23, 24, pl. ix, fig. 26 (dentition).
Hab.—Rarotonga (Cook Island).

6. *LIBERA RETUNSA*, Pse.

1864. P.Z.S., p. 670.
 1868. Pfr., Mon. Hel., vol. v, p. 220.
 1871. Pse., P.Z.S., p. 475 (*Pityls*).
 1872. Garrett, Amer. Journ. Conch., vol. vii, p. 226.
 1876. Pfr., Mon. Hel., vol. vii, p. 256.
 1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 220, *Patula retusa* [*sic*], Pse.
 1881. Clessin, Nomencl., p. 95 (*Endodonta*).
 1884. Garrett, Journ. Acad. Nat. Sci. Phil., ser. II, vol. ix, p. 35, pl. ii, fig. 8.
 1887. Tryon, Manual, vol. iii, p. 71, pl. xiii, fig. 81.
 1889. Pætel, Cat., p. 89 (*Pityls*).
 1894. Pilsbry, Manual, vol. ix, p. 24.
Hab.—Tahiti.

7. *LIBERA STREPTAXON*, Rve.

1849. Pfr., Zeitsch. für Malak., p. 74, *coarctata*, Pfr., non Fér. (Desh.).
 1849. Pfr., P.Z.S., p. 128.
 1850. Albers, Heliceen, p. 89 (*Endodonta coarctata*, "Pfr. M.S.").
 1852. Reeve, Conch. Icon., vol. vii, pl. cxii, fig. 641, *streptaxon* (syn. *coarctata*, Pfr.); Conch. Cab., p. 297, pl. cxxv, figs. 29-31, *cavernula*, H. & J. (syn. *coarctata*, Pfr., and *streptaxon*, Rve.).
 1853. Pfr., Mon. Hel., vol. iii, p. 143, *cavernula*, H. & J. (syn. *coarctata*, Pfr.).
 1854. H. & J., Voyage au Pole Sud, p. 19, pl. vi, figs. 21-4 (*turricula*, H. & J., non Lowe, 1833).
 1857. Pfr., Malak. Blätt., p. 34 (*streptaxon*, Pfr., Rve., = *coarctata*, Pfr. *olim*, nec Desh., = *bursatella*, Gld., figs. 52b-c, = *turricula*, Jacq., nec Lowe, = *cavernula*, Pfr., nec Jacq.).
 1858. Adams, Genera, p. 113, *Pityls cavernula*, H. & J. (*fide* Pfr.).
 1859. Pfr., Mon. Hel., vol. iv, p. 154 (*streptaxon*, Rve.; syn. *coarctata*, Pfr.; *turricula*, H. & J.; *cavernula*, Pfr., vol. iii, p. 143; *cavernula*, H. & A. Adams). He also quotes the figure in Conch. Cab. above mentioned, and figs. 52b-c of pl. iv of Gould's Expedition Shells, and above-mentioned fig. in Conch. Icon.
 1860. Albers, Heliceen, p. 90, *Endodonta cavernula* (*fide* Pfr.).
 1868. Pfr., Mon. Hel., vol. v, p. 220 (syn. *cavernula*, Pfr.; *coarctata*, Pfr.; *turricula*, H. & J.).
 1871. Pse., P.Z.S., pp. 452, 475 (*bursatella*, Gld.; syn. *coarctata*, Pfr.; *streptaxon*, Rve.; *turricula*, H. & J.).
 1876. Pfr., Mon. Hel., vol. vii, p. 255 (syn. *cavernula*, Pfr.; *coarctata*, Pfr.; *turricula*, H. & J.?).
 1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 220 (*Patula streptaxon*).

1881. Clessin, Nomencl., p. 96, ?*cavernula*, H. & J. (Mon. Hel., vol. iii, p. 143); *coarctata*, Pfr. *olim*; *turricula*, H. & J.
 1884. Garrett, Journ. Acad. Nat. Sci. Phil., ser. II, vol. ix, p. 34, *coarctata*, Pfr.; *bursatella*, Gld. (part.); *cavernula*, H. & J. (quoting their figure!); *streptaxon*, Rve.
 1887. Tryon, Manual, vol. iii, p. 71, syn. *turricula*, H. & J. (figd., pl. xiii, figs. 79, 80); *streptaxon*, Rve. (figd., pl. xiii, fig. 78); *bursatella*, Gld. (part.); not *cavernula*, H. & J.
 1889. Pætel, Cat., p. 90.
 1894. Pilsbry, Manual, vol. ix, p. 24 (as *coarctata*, Pfr.; syn. *turricula*, H. & J.; *streptaxon*, Rve.).

Hab.—Tahiti. On the ground in forests, north and east side of Moorea (Garrett).

The history of this species is curious. Originally part of Gould's *bursatella*, it was described by Pfeiffer in 1849 as *coarctata*. He then recognized that that name was preoccupied, and abandoned it in favour of *cavernula*, H. & J., a totally different shell. Meantime Hombron and Jacquinot had described it as *turricula* (nom. præoc.) and Reeve under its present name of *streptaxon*, which was forthwith adopted by Pfeiffer himself.

Garrett notes that a "variety (local) occurs which is uniform whitish". The short description given in the *Voyage au Pole Sud* is stated to have been drawn up from the figure only.

8. LIBERA GREGARIA, Garrett.

1884. Journ. Acad. Nat. Sci. Phil., ser. II, vol. ix, p. 36, pl. ii, figs. 6, 6a, 6b.
 1887. Tryon, Manual, vol. iii, p. 72, pl. xiii, figs. 83, 84.
 1889. Pætel, Cat., p. 85.
 1894. Pilsbry, Manual, vol. ix, p. 24.

Hab.—South-west part of Moorea.

9. LIBERA RECEDENS, Garrett.

1884. Journ. Acad. Nat. Sci. Phil., ser. II, vol. ix, p. 36, pl. ii, fig. 7.
 1887. Tryon, Manual, vol. iii, p. 72, pl. xiii, fig. 85.
 1889. Pætel, Cat., p. 89 (*Pityis*).
 1894. Pilsbry, Manual, vol. ix, pp. 23, 24, pl. ix, fig. 34 (dentition).

Hab.—Moorea (Society Islands).

Garrett states that "the deflection of the last whorl below the periphery of the penultimate whorl, which is an accidental character in some of the species, is *constant* in this".

10. LIBERA HEYNEMANNI, Pfr.

1862. Malak. Blätt., vol. ix, p. 151.
 1868. Pfr., Mon. Hel., vol. v, p. 219.
 1871. Pse., P.Z.S., p. 475 (*Pityis*).
 1874. Cat. Mus. Godeff. (*Patula Heinemanni*, p. 93; *P. Heynemanni*, p. 215).
 1876. Pfr., Mon. Hel., vol. vii, p. 255.
 1879. Kobelt, Jahrb. deutsch. Malak. Ges., p. 220 (*Patula*).

1881. Clessin, Nomencl., p. 96 (no reference to any figure!).
1884. Garrett, Journ. Acad. Nat. Sci. Phil., ser. II, vol. ix, p. 35, pl. ii, fig. 9 (*bursatella*, Gld., part.). He calls attention to the spiral sculpture, no mention of which occurs in Pfeiffer's description.
1887. Tryon, Manual, vol. iii, p. 72, pl. xiii, fig. 82.
1889. Pætel, Cat., p. 85 (*Pityis*).
1894. Pilsbry, Manual, vol. ix, p. 24.
- Hab.*—Tahiti.
- Helix excavata*, H. & J., Voyage au Pole Sud, 1854, p. 17, pl. vi, figs. 9-12.
1862. Gould, Otia, p. 243 (syn. of *bursatella*, Gld.), var. (immature); Conch. Cab., p. 296 (syn. of *Jacquinoti*, Pfr.).
1887. Tryon, Manual, vol. iii, p. 71 (syn. of *Jacquinoti*, Pfr.), pl. xiii, figs. 72-4.
1889. Pætel, Cat., p. 85 (syn. of *Jacquinoti*).
- 1853-81. Pfr., Mon. Hel., as syn. of *bursatella* or *Jacquinoti* (in vol. vii of both!).
1894. Pilsbry, Manual, vol. ix, p. 24 (syn. of *Jacquinoti*).

In the original description there is no mention of any plaits in the mouth, though the figure shows two on the parietal whorl. In the collection in the Paris Museum the specimens so named undoubtedly belong to *L. Heynemanni*, but as they also have specimens named *L. turricula* referable to the same species the evidence is not important. Hombron & Jacquinot's figures of *excavata*, copied by Tryon to illustrate *L. Jacquinoti*, apparently represent a young shell which seems to agree better with *L. Heynemanni* in general characters than with either of the other two species to which it has been at times assigned.
